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[US/US]; 19632 Quiet Bay Lane, Huntington Beach, CA  
92648 (US). MELVIN, David, A. [US/US]; 2149 W.  
Cheryll Court, Porterville, CA 93257 (US).

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(74) Agent: JACKSON, Harold, L.; Jackson Law Corpora-  
tion, 14751 Plaza Dr., Suite N, Tustin, CA 92780 (US).

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(71) Applicant (*for all designated States except US*): SNAP-  
WARE CORPORATION [US/US]; 4101 Bonita Place,  
Fullerton, CA 92835-1007 (US).

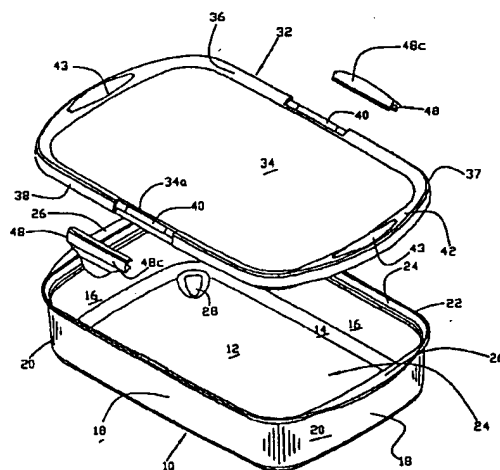
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(72) Inventors; and

(75) Inventors/Applicants (*for US only*): LOWN, John, M.

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(54) Title: CONTAINER AND SEALING COVER



(57) Abstract: A container (10) and sealable cover (32) in which the container (10) has a bottom wall (12) and an upstanding peripheral wall (16, 18) terminating in an upper edge (22) surrounding an open mouth. The peripheral wall (16, 18) is inclined outwardly at a slight angle to the vertical or alternatively vertically disposed. A replaceable cover (32) is provided with a central top planar wall (34) and an inverted U-shaped periphery terminating in an outer rim skirt (38). A contiguous downwardly extending sealing fin (44) is disposed inwardly of the skirt for forming an interference fit with the inside surface of the upper portion of the container peripheral wall when the cover (32) is installed over the container mouth. The fin (44) may be substantially vertically disposed or canted outwardly at a small angle to the vertical depending upon the inclination of the peripheral wall (16, 18). A pair of latches (48) are rotatably mounted on the cover (32) adjacent the outer rim skirt (38) and arranged to engage protruding latch hooks (50) on the container peripheral wall (16, 18) to releasably secure the cover (32) over the contain\*- mouth.

1  
DESCRIPTION

CONTAINER AND SEALING COVER

1 RELATED APPLICATION

This application is a continuation-in-part application of PCT/US01/02434, filed January 25, 2001, entitled CONTAINER AND SEALING COVER.

5 TECHNICAL FIELD

This invention relates generally to a container for storing foods, liquids and other articles and a replaceable cover or lid capable of providing a tight seal and more particularly to the container cover which is suitable for use  
10 in microwave cooking and in automatic dish washers.

BACKGROUND ART AND OBJECTS OF THE INVENTION

Food storage containers are generally made of a plastic material such as polypropylene or polyethylene polymers or copolymers. Such containers are normally fairly rigid, but may  
15 be subject to some amount of flexure especially where the lid or cover is arranged to be peeled off of the container mouth. Most such container/lid configurations provide a sealing bead or rim along the upper wall of the container with a mating channel on the lid which engages the bead as well as the  
20 adjacent inner and outer surfaces of the container wall. Such sealing arrangements generally require considerable effort to force the lid onto the sealing bead during the closing procedure and perhaps greater effort to peel the lid away from the container during the opening process. While some lids are  
25 provided with one or more outwardly extending tabs to accommodate a user's fingers, the opening procedure may be quite difficult for a person suffering from arthritis or tendinitis. In addition, the lids of such sealable containers often become distorted through heating, dishwashing or  
30 refrigeration procedures making lid replacement difficult or impossible. In addition containers designed for microwave use are generally provided with a separate vent located in the lid for preventing pressure build up.

1 In some designs a separate sealing member such as an O-  
ring or annular gasket is disposed between the container rim  
and the lid channel to provide a more secure seal. Such  
designs may rely on frictional forces to maintain the lid in  
5 place on the container or may rely on latching arms carried by  
the lids which engage retention lips on the container. In  
either case the separate sealing member, i.e., O-ring or gasket  
involves not only added manufacturing costs, but is subject to  
being misplaced or lost during use of the container.

10 There is a need for a more user friendly food storage  
container/cover which overcomes the above shortcomings.

#### SUMMARY OF THE INVENTION

A container in accordance with the present invention  
includes a bottom wall and an upstanding peripheral wall  
15 terminating in an upper edge surrounding an open top or mouth.  
At least an upper portion of the wall defines an inside sealing  
surface which circumscribes the wall below the peripheral edge.  
While the container is preferably rectangularly-shaped, it may  
also be circular or oval in shape.

20 A replaceable cover is provided which includes a top,  
preferably dish-shaped, with a planar top wall terminating in a  
downwardly extending outer rim flange or skirt. The skirt is  
arranged to fit over a substantial portion of the upper edge of  
the container. The cover includes a downwardly extending inner  
25 sealing flange circumscribing the cover inwardly of the outer  
flange. The sealing flange has a lower section terminating in  
a free edge, the perimeter of which is greater than the  
perimeter of the container sealing surface so that the lower  
section of the sealing flange forms an interference fit with  
30 the inside sealing surface of the container wall when the cover  
is pressed downwardly over the mouth or open top of the  
container.

A pair of latch handles are pivotally mounted on opposite  
sides of the cover along the outer rim flange thereof with each  
35 latch handle being provided with a protruding locking tab

1 arranged to snap under a section of the peripheral upper edge  
of the container wall when the latch handle is rotated  
downwardly to lock the cover in a sealing relationship over the  
container mouth. The outer rim skirt of the cover does not  
5 extend under the peripheral upper edge of the cover so that the  
cover can be readily removed when the latch handles are rotated  
upwardly to disengage the locking tabs from the peripheral  
upper edge of the container. Also when one of the latch  
handles is rotated to its unlocked position expanded fluid  
10 within the container will cause the lid (or a portion thereof)  
to rise slightly during microwave cooking to provide the  
necessary venting action to prevent excess pressure build-up.

In one embodiment the upper portion of the container  
peripheral wall is inclined outwardly at a slight angle to the  
15 vertical, say 2° to 5° and the sealing flange is substantially  
vertical.

In an alternative embodiment the upper portion of the  
container wall and the inside sealing surface defined thereby  
is substantially vertically disposed and the sealing flange is  
20 outwardly canted, when the bottom wall is positioned on a  
horizontal plane. The sealing flange seats against the inside  
sealing surface of the container wall when the cover is pressed  
downwardly over the mouth or open top of the container to form  
the interference fit. As an additional feature, to facilitate  
25 mating and un-mating the container and cover, the uppermost  
portion of the wall defines a transition or lead in surface for  
guiding the sealing flange into registry with the container  
sealing surface. Such transition surface may be inclined  
outwardly at an angle to the vertical, e.g., 45° or less, when  
30 the bottom wall is positioned in a horizontal plane.

The construction and function of preferred embodiments of  
the container/cover arrangement of the present invention may  
best be understood by reference to the following description  
taken in conjunction with the accompanying drawings in which  
35 like components are designated by the same reference numeral in

1 the several figures.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective top view of a container and cover in accordance with the present invention showing the cover in a separated condition with the latch handles unassembled;

Fig. 2 is a perspective bottom view of the container/cover of Fig. 1 showing the bottom of the cover and container in some detail;

Fig. 2a is an enlarged partial cross-sectional view of the cover of Fig. 2 taken along lines 2a-2a showing the disposition of the ribs;

Fig. 3 is a top plan view of the container;

Fig. 4 is a cross-sectional view of the container taken along lines 4-4 of Fig. 3 showing the angle that the upper portion of the container side wall makes with the vertical;

Fig. 5 is a bottom plan view of the cover;

Fig. 6 is a side elevational view of the cover;

Fig. 7 is a cross-sectional view of the cover taken along lines 7-7 of Fig. 5;

Fig. 8 is a top plan view of one of the latch handles;

Fig. 9 is a bottom plan view of a latch handle;

Fig. 10 is a side elevational view of a latch handle;

Fig. 11 is a bottom plan view of the container and cover in an assembled and locked position;

Fig. 12 is a top perspective view of the container and cover with one of the latch handles rotated to its fully upright position illustrating the simultaneous application of upward pressure to the latch handle and downward pressure to the cover for breaking the seal and releasing the cover from the container;

Fig. 13 is a side elevational view of the container and cover in an assembled and locked position; and

Fig. 13a is an enlarged sectional view of the right medial end of the assembled container and cover showing (a) the interference fit between the cover sealing flange and the

1 inside surface of the upper portion of the container side wall  
and (b) the configuration of the end section of the cover  
overlying the container handle;

Fig 14 is a perspective view of another container and  
5 cover in accordance with the present invention showing the  
cover in separated condition with the latch handles unassembled

Fig. 15 is a perspective bottom view of the  
container/cover of Fig. 14 showing the bottom of the cover and  
container;

10 Fig. 16 is a top plan view of the container of Fig. 14;

Fig. 17 is a cross-sectional view of the container taken  
along lines 17-17 of Fig. 16;

Fig. 17a an enlarged sectional view of the right medial  
end of the container showing the upper portion of the  
15 container;

Fig. 18 is a bottom plan view of the cover;

Fig. 19 is a side elevational view of the cover;

Fig. 20 is a partial cross-sectional view of the cover;

Fig. 21 is a top plan view of one of the latch handles;

20 Fig. 22 is a bottom plan view of a latch handle;

Fig. 23 is a side elevational view of a latch handle;

Fig. 24 is a side elevational view of the container and  
cover in an assembled and locked position;

Fig. 24a is an enlarged sectional view of the left medial  
25 end of the assembled container and cover showing (a) the  
sealing fit between the cover sealing fin and the inside  
surface of the upper portion of the container side wall and (b)  
the configuration of the end section of the cover overlying the  
container handle;

30 Fig. 25 is an enlarged sectional view of the left medial  
end of the assembled container and cover showing the cover  
sealing flange and the inside surface of the uppermost portion  
of the container side wall prior to flexure;

Fig. 26 is an enlarged sectional view of the latch handle  
35 in its open position;

1        Fig. 27 is an enlarged sectional view of the latch handle rotated in its closed position;

      Fig. 28 is a bottom plan view of the container and cover in an assembled and locked position.

5        DESCRIPTION OF THE PREFERRED EMBODIMENT

      Referring now to Figs. 1-4, the container 10 of the present invention includes a flat bottom wall 12 which merges at its periphery, via a rounded corner 14, with a peripheral wall, comprising end walls 16 and side walls 18. As discussed previously, while the container shown in the drawings has a rectangular shape, the container of the present invention may have a circular or oval shape with only a peripheral upstanding wall. The end and side walls of the container 10 are merged, via rounded corners 20, as shown. The peripheral wall (16, 18) terminates in an upper edge 22, via an outwardly extending convex shaped segment 24. The edge 22 surrounds and defines an open top or mouth 25 of the container 10 and forms a pair of horizontally protruding handles 26 above the end walls 16 as shown. The top surface of the handles are substantially level with the plane of the edge 22 simplifying the manufacturing process and allowing the cover to overlies the handles as illustrated for example in Fig. 12 to be described. The bottom wall 12 of the container projects downwardly at the corners forming triangular shaped protruding feet 28.

25        The peripheral wall (16,18) has a slight convex surface, preferably formed along a radius R of about 75 inches, so that an upper section 30 of the peripheral wall (extending below the curved segment 24) is disposed at about an angle  $\theta$  of  $2^\circ$  to  $5^\circ$  and preferably about  $3^\circ$  to the vertical with the bottom 12 lying in a horizontal plane as is illustrated in Fig. 4. This slight angle facilitates the entry of a peripheral sealing flange or fin 44 on the cover, to enter the mouth of the container and form an interference or sealing fit with an inner sealing surface 30b formed on a lower portion of the wall

30        section 30 when a cover 32 is seated onto the container, as

35

1 will be explained in more detail. See Figs. 4 and 13a.

Referring now to Figs. 1, 2 and 5-8, a replaceable cover or lid 32 for use with the container 10 is formed with a generally planar depressed wall section 34 which merges with an upwardly inclined peripheral section 36 joined along apex 37 to a downwardly extending outer rim flange or skirt 38. The top of the cover, i.e., wall 34 and section 36 forms a dish-like shape for receiving the bottom of a like container/lid combination in a nesting arrangement. The outer flange or skirt 38 is interrupted by a pair of axel sections 40 which are spaced from the adjacent wall section 34 as is illustrated in Figs. 1 and 5 to receive latching handles 48 to be described. The skirt 38 fits over the upper edge of the container except for the axel portions. The cover 32 includes extended end sections 42 which fit over the top of the container handles 26 in the assembled condition. The end sections 42 define slightly depressed oblong sections 43 which overlies and accentuate the container handles. See Fig. 13a.

The cover 32 further includes a downwardly extending inner sealing flange, rib or fin 44 positioned inwardly of the outer skirt 38. The rib or fin 44 has a base 44a joined to the bottom of the wall section 34 and terminates in a free edge 44b. The sealing fin or at least the free edge thereof has a slightly greater periphery than the periphery of the inside sealing surface 30b of the peripheral wall of the container so that lower end of the fin 44 is deflected slightly inwardly by the inner sealing surface 30b of the wall section 30 in the assembled condition. The slight deflection provides an interference and sealing fit between the fin 44 and the inside surface 30b of the container peripheral wall. See, for example, Fig. 13a. The sealing flange, the outer rim skirt and the inclined peripheral section 36 of the cover form an inverted generally U-shaped cavity. Spaced vertical ribs 46 are formed along the underside of the peripheral section 36 and extend between the inner sides of the skirt 38 and the base of



1 the sealing flange as shown in Figs. 2 and 2a to serve as stop  
members to limit the downward movement of the cover and thereby  
control the extent or height of the seal between the cover  
sealing fin and the container sealing surface. The stop  
5 member, when abutted against the upper edge of the container,  
informs the user that a positive seal has been obtained.

In the embodiment just described the cover sealing flange  
or rib 44 is substantially vertical and the inner sealing  
surface 30b on the upper peripheral wall of the container is  
10 slanted or canted outwardly by the angle  $\theta$  of say  $2^\circ$  to  $5^\circ$   
degrees. In an alternative embodiment, to be described in  
conjunction with Figures 14-28, the cover sealing flange or rib  
is canted outwardly in its unstressed or unseated condition and  
the inner sealing surface of the container wall is generally  
15 vertically inclined. With this arrangement as with the  
embodiment of Figs. 1-13, the lower portion of the cover  
sealing rib is forced inwardly against the container sealing  
surface to provide the sealing action when the cover is pressed  
downwardly over the mouth of the container.

20 Referring again to the embodiment of Figures 1-13 and more  
particularly to Figs. 8-10, the cover or lid 32 is removably  
secured (and sealed) to the container 10 by means of a pair of  
oppositely disposed latching handles 48 which engage the  
underside 50a of a pair of latch hooks 50 formed on the outside  
25 of the peripheral upper edge of the container wall as is  
illustrated by the dashed lines in Fig. 13. Each latch handle  
is formed with an upper surface 48a including an outwardly  
extending finger engaging surface 48b, a back wall 48c and a  
lower surface. The lower surface is formed with a pair of  
30 short protruding spaced inner walls 48d which together with the  
back wall form two semicircular recesses 48e with downwardly  
faced openings 48f for receiving an associated axel 40. The  
lower latch handle surface further forms a downwardly  
protruding locking tab 48g for engaging the lower edge 50a of  
35 an associated locking hook 50 on the container wall.

1 Additionally the lower latch handle surface includes a finger engaging surface 48h.

The latch handles are assembled to the cover or lid 32 by spreading the inner walls 48 slightly away from the back wall 48c (in a snapping action) to allow each axel to enter the respective recess 48e. The back wall 48c of each latch handle limits the rotational movement of the associated latch handle to about 90° by engaging the edge 34a of the wall 34 when the upper surface of the handle is about parallel to the surface 34. It should be noted that the edge 34a may include a small upward curvature formed as part of the arched peripheral section 36.

As discussed previously and as illustrated in Figs. 13 and 13a, skirt 38, while fitting over the upper edge of the container, except for the axel portions, does not extend under the upper peripheral edge of the container wall. As a result, only the latch handles serve to lock the cover and container together.

In use, the cover 32 with the latch handles assembled thereon, may be placed over the mouth or top 24 of the container 10 and then pressed downwardly until the ribs 46 are seated on the container's upper edge 22. In this position the inner sealing flange 44 forms an interference fit with the inside of the container peripheral wall. The latch handles may then be easily rotated to a closed position by pressing downwardly and inwardly on the finger engaging surfaces 48b until the locking tabs 48g snap under the locking hooks 50.

The locked container and cover, with the contents stored therein, is now ready for storage. To open the cover it is only necessary to rotate one or both of the latch handles to an unlocked position and lift the cover. If desired, one latch handle (or both) may be rotated to its upper most position and pressed upwardly (e.g., by a finger 52) while an area of the planar surface 34 of the cover adjacent the handle is simultaneously pressed downwardly (e.g., by a thumb 54). This

1 simple maneuver causes the surface 34 to assume a slightly  
concave bow to break the seal and release the cover from the  
container. See Fig. 12.

Another preferred embodiment of a storage container and  
5 lid is illustrated in Figs. 14-17. This embodiment is very  
similar to the embodiment of Figures 1-13 except that the  
sealing rib on the lid is canted outwardly and the inner  
sealing surface along the upper portion of the container  
peripheral wall is about vertical. The container 110, like the  
10 container 10, includes a flat bottom wall 112 which merges at  
its periphery, through rounded corners 114, with a peripheral  
wall, comprising end walls 116 and side walls 118. The end and  
side walls of the container 110 are merged through rounded  
corners 120. The peripheral wall (116, 118) terminates in an  
15 upper edge 122. The edge 122 surrounds and defines an open top  
or mouth 125 of the container 110 and forms a pair of  
horizontally protruding handles 126 above the end walls 116 as  
shown. The top surface of the handles are substantially level  
with the plane of the edge 122 simplifying the manufacturing  
20 process and allowing the cover to overlies the handles. The  
bottom wall 112 of the container projects downwardly at the  
corners forming triangular shaped protruding feet 128.

The uppermost section of peripheral wall (116, 118) has a  
short transition or lead in wall segment 123 extending below  
25 the upper edge 122 and above a surface 124a formed on the  
inside of an upper section 124 of the peripheral wall as is  
best illustrated in Figures 17a, 24a, 25 and 27. The surface  
124a, which circumscribes the interior of the upper peripheral  
wall is referred to as the inside sealing surface. The short  
30 lead in segment 123 is inclined outwardly at an angle  $\lambda$  to the  
vertical. The angle  $\lambda$  and angle  $\Phi$  (to be discussed) between  
the cover sealing rib or fin and the vertical must be  
correlated to allow the lid to be seated on the container with  
a reasonable amount of force. The angled lead in segment 123  
35 and the inner surface 123a formed thereby facilitate the entry

1 of an inner sealing rib or fin 144 (described below) on the  
cover to enter the mouth of the container and form a sealing  
fit with the generally rectangular sealing surface area 124a  
when a cover 132 is seated onto the container. This angled  
5 transition wall segment 123 also facilitates removal of the  
cover. See Figs. 24 and 25. The transition wall segment may be  
about 1/16 to 1/8 inches in height. The angle  $\lambda$  should not  
exceed 45° and preferably is within the range of about 10° to  
20° and most preferably about 15°. The inside sealing surface  
10 124a of wall section 124 is generally vertically disposed.  
Reference numbers 127 and 129 (Fig. 17a) indicate the direction  
of vertical planes and horizontal planes, respectively, in  
relation to the container bottom 122. The rest of wall 118  
below the wall section 124 may taper inwardly to the bottom  
15 112, which facilitates nesting of two or more containers.

Referring now to Figs. 14, 15 and 18-20, a replaceable  
cover or lid 132 for use with the container 110 is formed with  
a generally planar depressed wall section 134 which merges with  
an upwardly inclined peripheral section 136 joined along apex  
20 137 to a downwardly extending outer rim flange or skirt 138.  
The top of the cover, i.e., wall 134 and section 136 forms a  
dish-like shape for receiving the bottom of a like  
container/lid combination in a nesting arrangement. The outer  
flange or skirt 138 is interrupted by a pair of axel sections  
25 140 which are spaced from the adjacent wall section 134a as is  
illustrated in Figs. 14 and 18 to receive latching handles 148  
to be described. The skirt 138 fits over the upper edge of the  
container except for the axel portions and like the skirt 38 of  
the cover 32, does not extend under the upper peripheral edge  
30 of the container wall. The cover 132 includes extended end  
sections 142 which fit over the top of the container handles  
126 in the assembled condition. The end sections 142 define  
slightly depressed oblong sections 143 that overlie and  
accentuate the container handles. See Fig. 14.

35 The cover 132 further includes a downwardly extending

1 inner sealing flange, rib or fin 144 positioned inwardly of the  
outer skirt 138. The flange or fin 144 is canted or inclined  
outwardly from the vertical through an angle  $\Phi$  such that the  
free end 144a of the fin 144 is deflected or bent inwardly by  
5 the container inside sealing surface 124a with the lower half  
portion 144b of the fin being seated against the sealing  
surface 124a in the assembled condition. The cant or  
inclination angle  $\Phi$  (Fig. 26) may be as great as  $20^\circ$  but  
preferably is in the range of about  $4^\circ$  to  $8^\circ$  and most preferably  
10 about  $6^\circ$ . The deflection of the fin 144 by the inside sealing  
surface 124a of the wall section 124 provides a bending force  
and consequentially a lateral force there-between which  
enhances a sealing or interference fit between the fin 144 and  
the inside surface 124a of the container wall section 124. As  
15 will be noted the free edge 144a of the sealing fin 144 has a  
greater periphery than the periphery of the container inside  
sealing surface 124a. See, for example, Fig. 24a.

It has been discovered that a length to height ratio for  
the fin 144 is preferably about 4.0 to 5.0 and most preferably  
20 about 4.5 for ease of manufacturing the rib integrally with  
the cover by injection molding processes. A fin with a  
thickness of .055 inches at its base 144c would most preferably  
be .25 inches in height. The fin or rib 144 has a draft, i.e.,  
thinner at the free end than at the base, of about  $2^\circ$  to  $3^\circ$ . The  
25 lower this height to width ratio the easier and more reliable  
the manufacturing process. The selection of the fin cant angle  
 $\Phi$ , the height of the fin and placement of the fin on the cover  
in relation to the vertical sealing wall section 124 when the  
cover and container are mated are preferably selected such that  
30 about one-half of the fin's lower surface area is pressed into  
contact with the inner sealing surface 124a. The amount of  
flexure, i.e., bending of the sealing fin 144, preferably  
should not exceed 20% to 30% of the maximum yield strength of  
the fin. The vertical force required to seat the lid on the  
35 container may be of the order of 6 to 10 and preferably about 8

1 ounces per linear inch to accommodate the strength of the  
anticipated users while providing the desired seal.

5 Spaced vertical ribs 146 are formed along the underside of  
the peripheral section 136 and the inner side of skirt 138 as  
shown in Fig. 15 and 18 to provide structural rigidity and seat  
on the upper edge 122 of the container.

A pair of oppositely disposed latch handles 148 engage the  
underside 150a of a pair of latch hooks 150 formed on the  
peripheral upper edge of the container wall. Each latch handle  
10 is formed with an upper surface 148a including an outwardly  
extending finger engaging surface 148b, a back wall 148c and a  
lower surface. The lower surface is formed with a pair of  
short protruding spaced inner walls 148d which together with  
the back wall form two semicircular recesses 148e with  
15 downwardly faced openings 148f for receiving an associated axel  
140. The lower latch handle surface further forms a downwardly  
protruding locking tab 148g with a bead 148i for engaging the  
lower edge 150a of an associated locking hook 150 on the  
container wall. Additionally the lower latch handle surface  
20 includes a finger engaging surface 148h.

The latch handles 148 are snapped onto the axels 140 and  
the cover 132 placed over the mouth or top 125 of the container  
110 with the fin inserted into the transition segment  
facilitating the assembly process. See Fig. 24 and 25. The  
25 cover 132 is then pressed downwardly until the ribs 146 are  
seated on the container's upper edge 122. In this position the  
sealing fin 144 forms a seal with the inside of the container.  
See Fig. 23a and 26. The latch handles 148 may then be easily  
rotated to a closed position by pressing downwardly and  
30 inwardly on the finger engaging surfaces 148b until the locking  
tabs 148g is rotated to snap the bead 148i under the locking  
hooks 150 as illustrated in Fig. 26.

Removal of the cover from the container may be  
accomplished similarly to the first above-described embodiment  
35 as described and illustrated with reference to Fig. 12.

1       The container (10, 110) may be made (i.e., injection  
molded) of a suitable rigid or semi-rigid plastic such as  
polypropylene, but is preferably made of polycarbonate which is  
suitable for microwave and conventional dishwasher use. While  
5   the bottom of the container may be frosted the sides are  
preferably transparent or translucent to enable the food or  
material stored in the container to be readily viewed. It  
should be noted that to vent excess gas pressure from the  
container interior (as a result of cooking) it is only  
10   necessary to unlatch one of the latch handles.

      The cover or lid (32, 132) as well as the latch handles  
may also be made of a suitable plastic, but are preferably made  
of polypropylene, having sufficient rigidity so that the inner  
flange of skirt (44, 144) forms an interference or sealing fit  
15   with the inner surface of the container wall in the assembled  
condition. The cover also preferably has sufficient beam  
strength and flexibility so that when an upward force is  
exerted on the finger engaging lower surface (48h, 148h of one  
or both latch handles (when in their upward most position) and  
20   a downward force is exerted on the planar top cover surface  
adjacent the latch handle the outer rim flange (38, 138) will  
flex outwardly and upwardly to break the seal and disengage the  
cover from the container. This feature adds to the user  
friendliness of the container/lid arrangement and particularly  
25   for persons suffering from arthritis or tendinitis of the hands  
an wrists.

      The above-described storage container/cover arrangements  
can be made in a variety of sizes, i.e., lengths, widths and  
depths (e.g., 12" x 7 ½" x 2" etc.), with or without a designed  
30   stacking system. The container with the cover removed may be  
used as a serving dish.

      There has thus been described improved, simple and  
inexpensive container/cover combinations which provides a  
reliable sealing system for food stuffs. Various modifications  
35   of the combination will occur to persons skilled in the art

- 1 without involving any departure from the spirit and scope of the invention as defined in the appended claims.



1 CLAIMS:

1. The combination of a container having an open top and a cover for sealing the open top container comprising:

5 a container having a bottom wall and an upstanding peripheral wall terminating in an upper edge surrounding an open top, the upper portion of the peripheral wall defining an inside sealing surface;

a cover having a top wall with a down turned periphery terminating in an outer rim flange for fitting over at least a  
10 substantial portion of the upper edge of the container, the cover having a downwardly extending sealing flange circumscribing the cover inwardly of the outer rim flange, the inner sealing flange having a lower section terminating in a free edge with the free edge having a perimeter greater than  
15 the perimeter of the inside sealing surface of the container peripheral wall so that when the cover is pressed downwardly over the open top container the sealing fin free edge is forced inwardly to provide an interference fit between the lower section of the sealing flange and the container wall sealing  
20 surface; and

a pair of latch handles pivotally mounted on opposite sides of the cover adjacent the outer rim flange thereof, each latch handle having a protruding locking tab arranged to snap under a section of the peripheral upper edge of the container  
25 side wall when the latch handle is rotated downwardly to lock the cover in place over the container open top with the inner sealing flange engaging the upper portion of the container side wall to secure the cover over the open top.

2. The invention of claim 1 wherein one of the container  
30 inside sealing surface and the cover inner sealing flange is canted outwardly with respect to the vertical and the other is positioned substantially vertically.

3. The invention of claim 2 wherein the cover sealing flange is canted outwardly and the container inside sealing  
35 surface is disposed substantially vertically.

- 1        4. The invention of claim 3 wherein  $\Phi$  represents the inclination of the cover sealing flange with the vertical and wherein  $\Phi$  is within the range of about  $4^\circ$  to  $20^\circ$ .
- 5        5. The invention of claim 4 wherein  $\Phi$  is within the range of about  $4^\circ$  to  $8^\circ$ .
- 6        6. The invention of claim 5 wherein  $\Phi$  is about  $6^\circ$ .
- 7        7. The invention of claim 5 wherein the peripheral wall of the container defines an inner lead in surface which is inclined outwardly at an angle  $\lambda$  to guide the cover sealing
- 10       8. The invention of claim 7 wherein  $\lambda$  is within the range of about  $10^\circ$  to  $45^\circ$ .
- 9        9. The invention of claim 8 wherein  $\lambda$  is within the range of about  $10^\circ$  to  $20^\circ$ .
- 15       10. The invention of claim 1 wherein the cover defines an inverted generally U-shaped cavity and further including spaced stop members disposed in the cavity for engaging the upper edge of the container to limit the downward movement of the cover relative to the container.
- 20       11. The invention of claim 2 wherein the cover sealing flange is disposed substantially vertically and wherein the container inside sealing surface is inclined outwardly at an angle  $\theta$  which is within the range of about  $2^\circ$  to  $5^\circ$ .
- 25       12. The invention of claim 11 wherein  $\theta$  is about  $3^\circ$ .
- 30       13. The invention of claim 2 wherein each latch handle defines an upper and lower surface with the locking tab extending downwardly from the lower surface and a manually actuatable tongue extending outwardly of the locking tab and wherein the top wall of the cover has such resiliency and strength that when pressed downwardly adjacent a latch handle while the manually actuatable tongue of the latch handle is pressed upwardly from an unlocked position, the outer rim flange will flex upwardly and outwardly to facilitate the removal of the cover.

1        14. The invention of claim 2 wherein the outer rim flange  
of the cover defines a pair of axels on opposite sides of the  
cover, each latch handle defining a cooperating groove which  
fits over the associated axel to provide the pivotal mounting  
5 of the latch handles.

15        15. The invention of claim 14 wherein the container is  
generally rectangular in shape.

16. The invention of claim 15 wherein the axels are spaced  
outwardly from the cover top wall and each latch handle defines  
10 a back wall which engages the cover top wall to limit the  
rotational movement of the latch handle when rotated in an  
unlocking direction.

17. The invention of claim 16 wherein the rotational  
movement of each latch handle is limited to an angle of about  
15 90° from a locked to an unlocked position.

18. The invention of claim 17 wherein each latch handle  
includes a manually actuatable tongue extending outwardly of the  
locking tab and wherein the top wall of the cover has such  
resiliency and strength that when pressed downwardly adjacent  
20 the latch handles while the manually actuatable tongues are  
pressed upwardly in the unlocked position, the outer rim flange  
will flex upwardly and outwardly to facilitate the removal of  
the cover.

19. The invention of claim 18 wherein the height to  
25 thickness ratio of the sealing fin is within the range of about  
4.0 to 5.0.

20. The invention of claim 19 wherein the sealing fin and  
the substantially vertically disposed inside surface of the  
upper portion of the peripheral wall are arranged such that  
30 when the cover and container are mated the lower portion of the  
sealing fin seats against the substantially vertically disposed  
inside surface of the upper wall portion.

21. The invention of claim 20 wherein the cover top wall  
is generally planar with an upwardly inclined section joined to  
35 the outer rim flange to form a dish-like shape to receive the

1 bottom of another container.

22. The invention of claim 21 wherein the peripheral wall is formed along a radius.

23. The combination of a container having an open top and  
5 a cover for sealing the open top comprising:

a container having a bottom wall and an upstanding peripheral wall terminating in an upper edge surrounding an open top, the peripheral wall defining an upper inside sealing surface which is substantially vertically disposed when the  
10 bottom wall is positioned in a horizontal plane;

a cover for seating on the upper edge of the container, the cover having a downwardly extending inner sealing fin which, in its unstressed condition, is canted outwardly at an angle  $\Phi$  to the vertical to establish a sealing fit with the  
15 substantially vertically disposed inside sealing surface of the container when the cover is pressed downwardly over the open top of the container; and

latching means for removably securing the cover over the container to maintain the seal between the sealing fin and the  
20 container sealing surface.

24. The invention of claim 22 wherein the  $\Phi$  is within the range of about  $4^\circ$  to  $20^\circ$ .

25. The invention of claim 24 wherein  $\Phi$  is within the range of about  $4^\circ$  to  $8^\circ$ .

26. The invention of claim 23 wherein the cover defines an inverted generally U-shaped cavity between the outer skirt and the inner sealing fin and further including spaced stop ribs disposed within the cavity for engaging the upper edge of the container wall to limit the downward movement of the cover  
30 relative to the container.

27. The invention of claim 23 wherein the height to thickness ratio of the sealing fin is within the range of about 4.0 to 5.0.

28. The invention of claim 23 wherein the latching means  
35 includes pair of latch handles pivotally mounted on opposite

1 sides of the cover adjacent the outer rim flange thereof, each  
handle having a protruding locking tab arranged to snap under a  
section of the peripheral upper edge of the container side wall  
when the latch handle is rotated downwardly to lock the cover  
5 in place over the container open top with the inner sealing  
flange engaging the upper portion of the container side wall to  
seal the cover to the open top.

29. The invention of claim 28 wherein each latch handle  
defines an upper and lower surface with the locking tab  
10 extending downwardly from the lower surface and a manually  
actuable tongue extending outwardly of the locking tab and  
wherein the top wall of the cover has such resiliency and  
strength that when pressed downwardly adjacent a latch handle  
while the manually actuable tongue of the latch handle is  
15 pressed upwardly from an unlocked position, the outer rim  
flange will flex upwardly and outwardly to facilitate the  
removal of the cover.

30. The invention of claim 29 wherein the outer rim  
flange of the cover defines a pair of axels on opposite sides  
20 of the cover, each latch handle defining a cooperating groove  
which fits over the associated axel to provide the pivotal  
mounting of the latch handles.

31. The invention of claim 30 wherein the axels are spaced  
outwardly from the cover top wall and each latch handle defines  
25 a back wall which engages the cover top wall to limit the  
rotational movement of the latch handle to an angle of about  
90° from a locked to an unlocked position.

32. The invention of claim 31 wherein each latch handle  
includes a manually actuable tongue extending outwardly of the  
30 locking tab and wherein the top wall of the cover has such  
resiliency and strength that when pressed downwardly adjacent  
the latch handles while the manually actuable tongues are  
pressed upwardly in the unlocked position, the outer rim flange  
will flex upwardly and outwardly to facilitate the removal of  
35 the cover.

1        33. The invention of claim 32 wherein the cover top wall  
is generally planar with an upwardly inclined section joined to  
the outer rim flange to form a dish-like shape to receive the  
bottom of another container.

5        34. A container/lid for storing food stuffs and the like  
comprising:

        a lid having an annular downwardly depending fin tapering  
outwardly;

        a container with a circumscribing wall with an upper edge  
10 defining a mouth, the annular outwardly depending fin arranged  
on the lid such that when the lid is mated with the container,  
the fin seats against the wall applying horizontal pressure  
thereto and establishing a seal between the wall and the fin;  
and

15        a pair of latch handles rotatably mounted on wall of the  
container adjacent the upper edge thereof, each latch handle  
having a protruding locking tab arranged to snap under a  
peripheral upper edge of the container to releasably secure the  
lid cover to the container mouth.

20        35. The invention of claim 34 wherein the wall has a  
uppermost portion which is tapered outwardly at an angle to the  
vertical to accept the fin prior to sealing.

        36. The invention of claim 35 the upper portion of the  
wall defines an interior generally rectangular sealing surface  
25 area disposed below the uppermost outwardly tapered portion,  
the sealing area being substantially vertically disposed for  
receiving the fin in a sealing relationship.

        37. The invention of claim 36 wherein the fin tapers  
outwardly at an angle of about 4 to 8 degrees.

30        38. The invention of claim 37 wherein the cover is made  
of polypropylene.

        39. The invention of claim 38 wherein the container is  
made of polycarbonate.

        40. A container/lid for storing food stuffs and the like  
35 comprising:

1 a rectangularly-shaped container having a bottom wall, a  
pair of side and end walls extending upwardly from the bottom  
wall at a slight angle to the horizontal and terminating in an  
upper edge surrounding a mouth, the upper portion of the side  
5 and end walls defining an interior rectangular sealing area;

a lid having a depressed planar top wall which merges into  
an upwardly extending medial portion joined to a downwardly  
extending outer rim skirt circumscribing at least the major  
portion of the lid, the lid having a downwardly extending  
10 sealing fin disposed inwardly of the skirt, which fin has a  
free edge with a slightly greater periphery than the periphery  
of the container sealing area so that the free end of the fin  
is flexed inwardly to form an interference fit with the  
rectangular sealing area of the container end and side walls  
15 when the lid is seated over the container mouth; and

latch means for removably securing the lid over the  
container mouth so that the lid sealing fin is sealed against  
the sealing area of the container end and side walls.

41. The invention of claim 40 wherein the outer rim skirt  
20 of the lid is interrupted on opposite sides by a generally  
cylindrical axel spaced from the depressed top wall and wherein  
the latch handles are mounted on the axels.

42. The invention of claim 40 wherein the top wall of the  
lid has such strength and resiliency that when pressed  
25 downwardly adjacent the latch handles while the latch handles  
are forced upwardly the edges of the top wall will bow slightly  
upwardly adjacent the latch handles and release from the  
container.

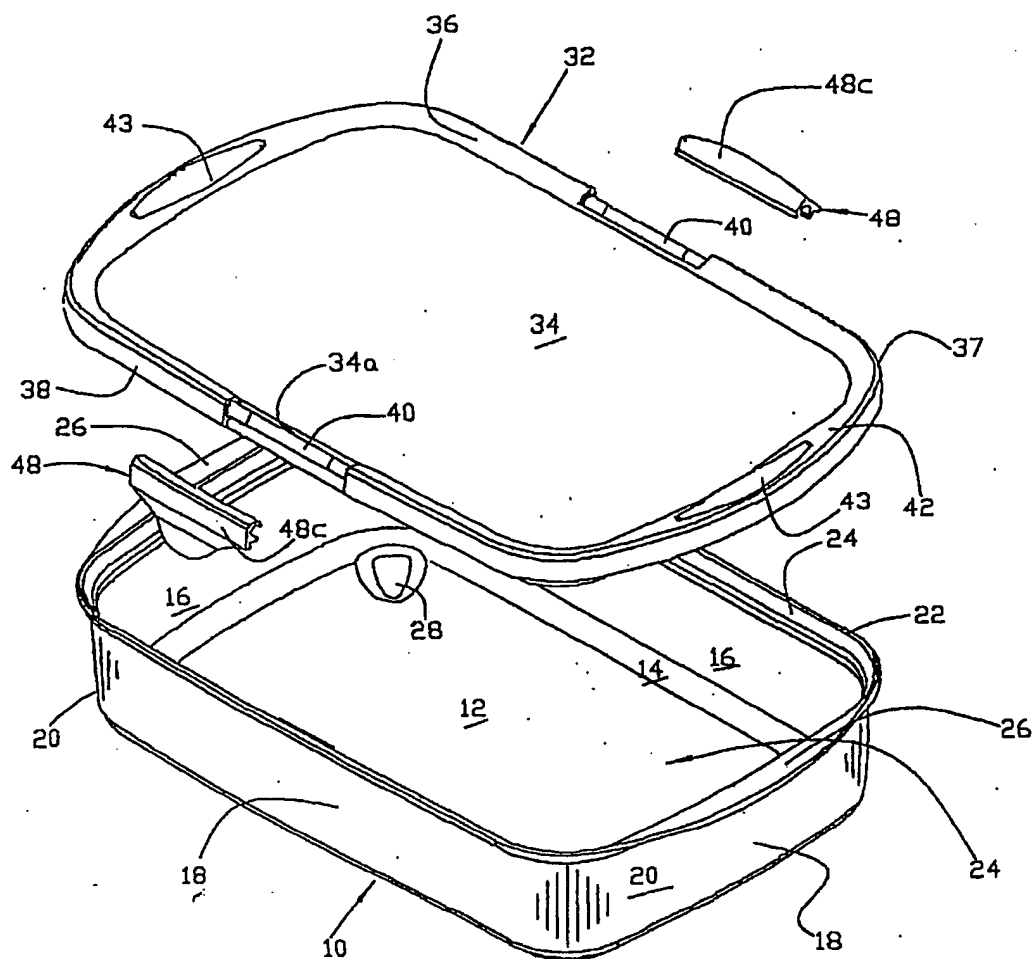


Fig. 1



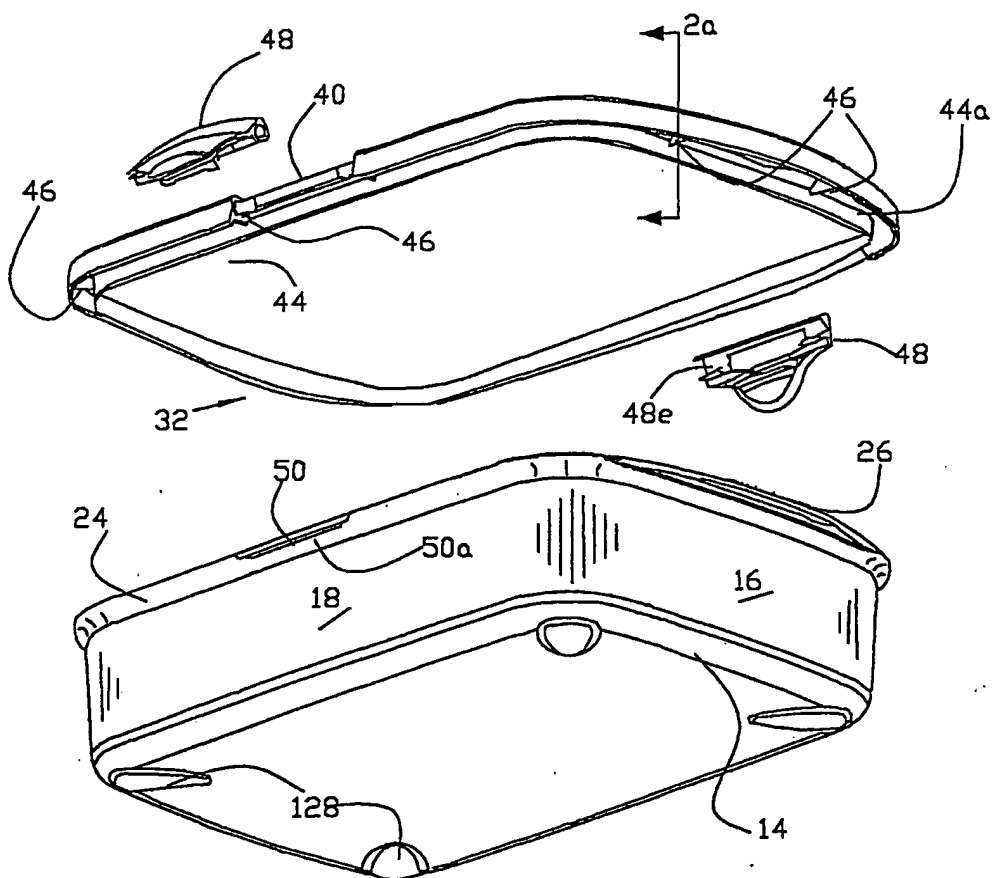


Fig. 2

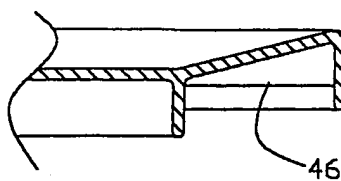


Fig. 2a

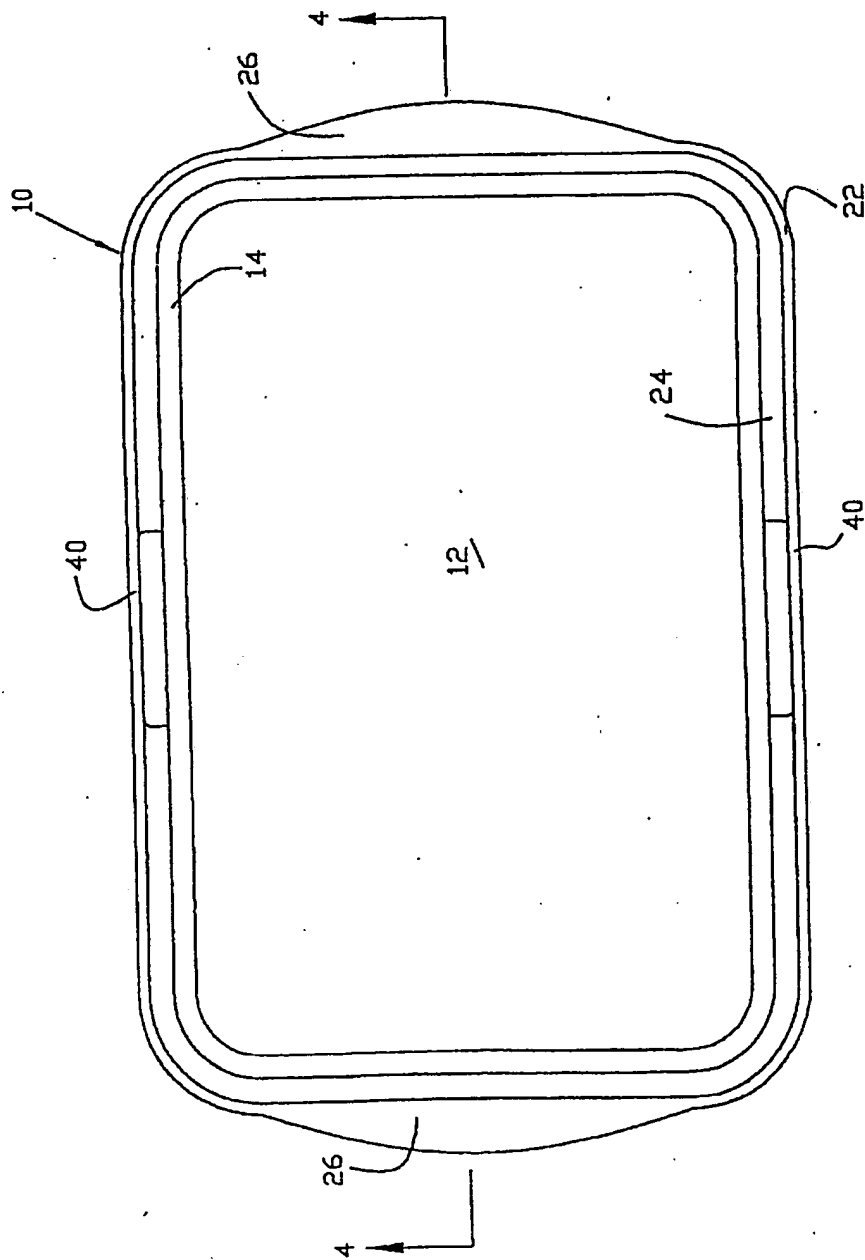


Fig. 3

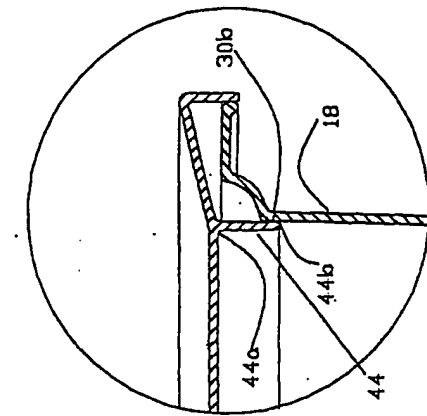


Fig. 13a

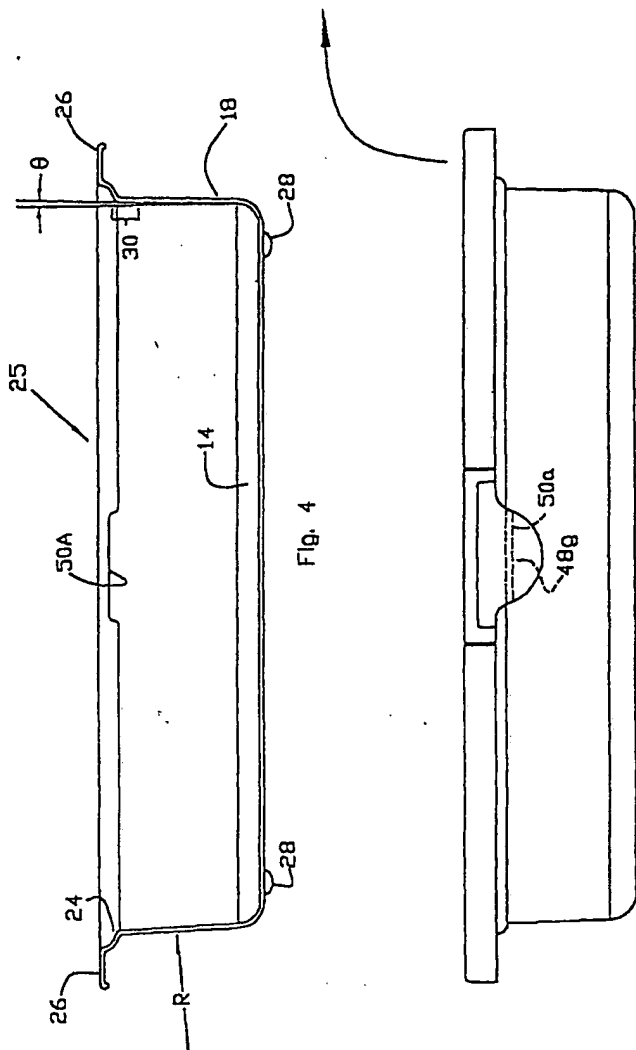
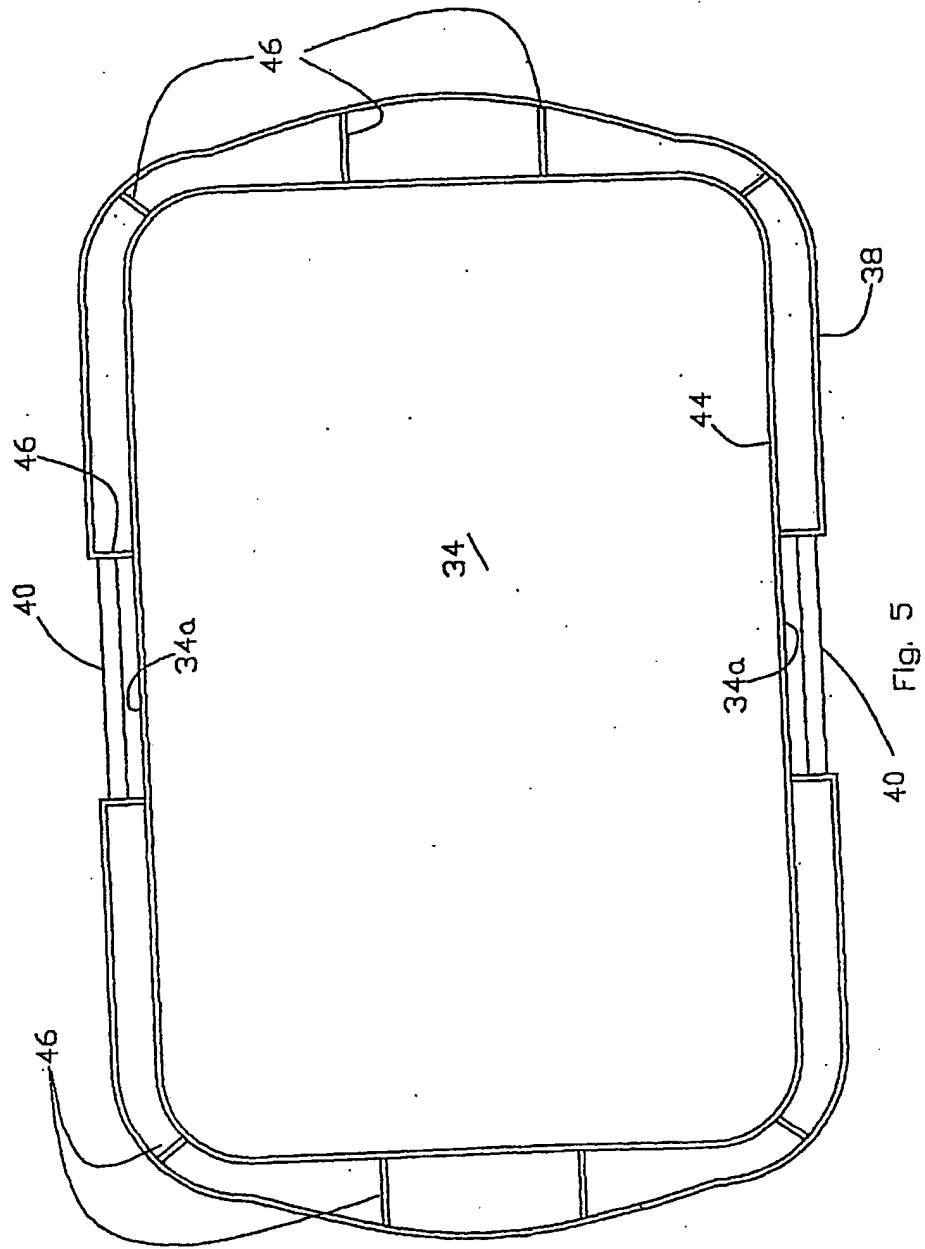


Fig. 4

Fig. 13



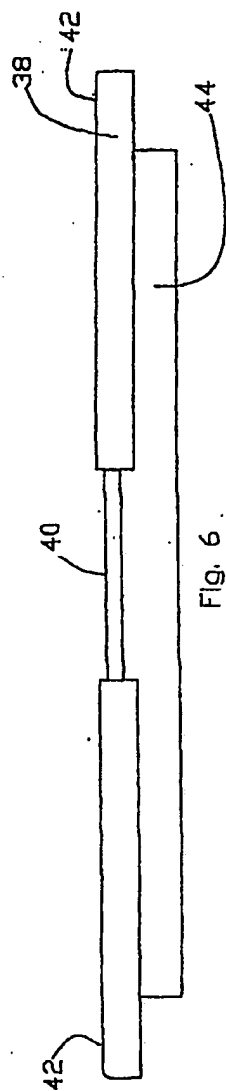


Fig. 6

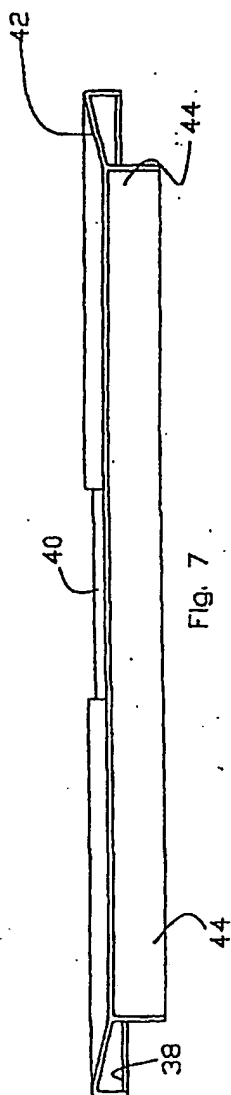


Fig. 7

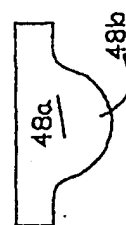


Fig. 8

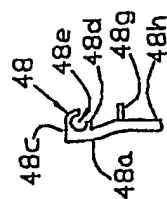


Fig. 9

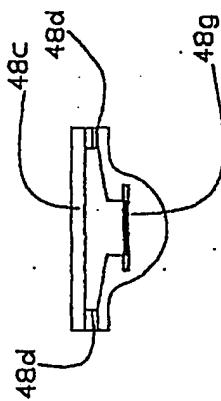


Fig. 10

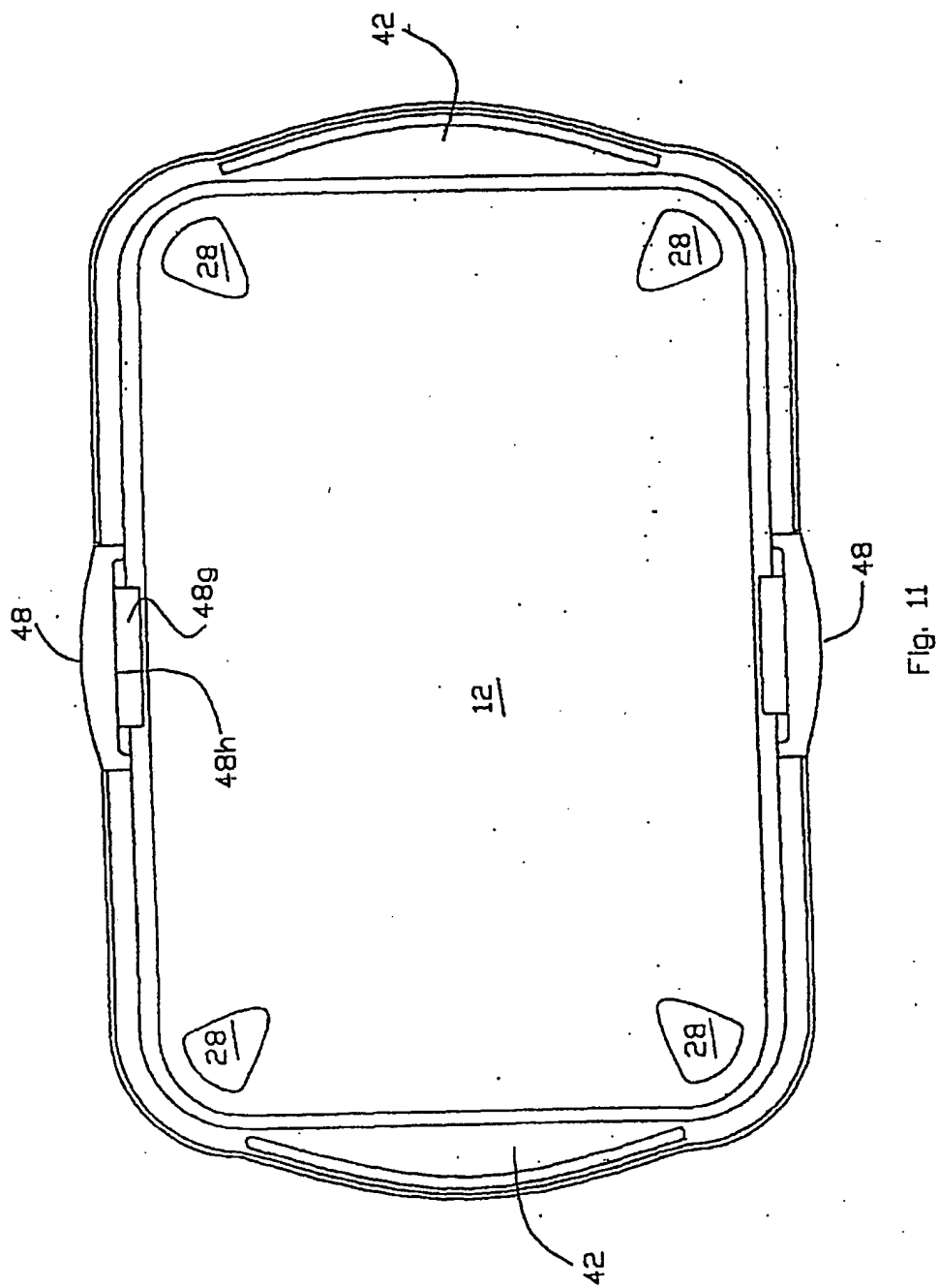


Fig. 11

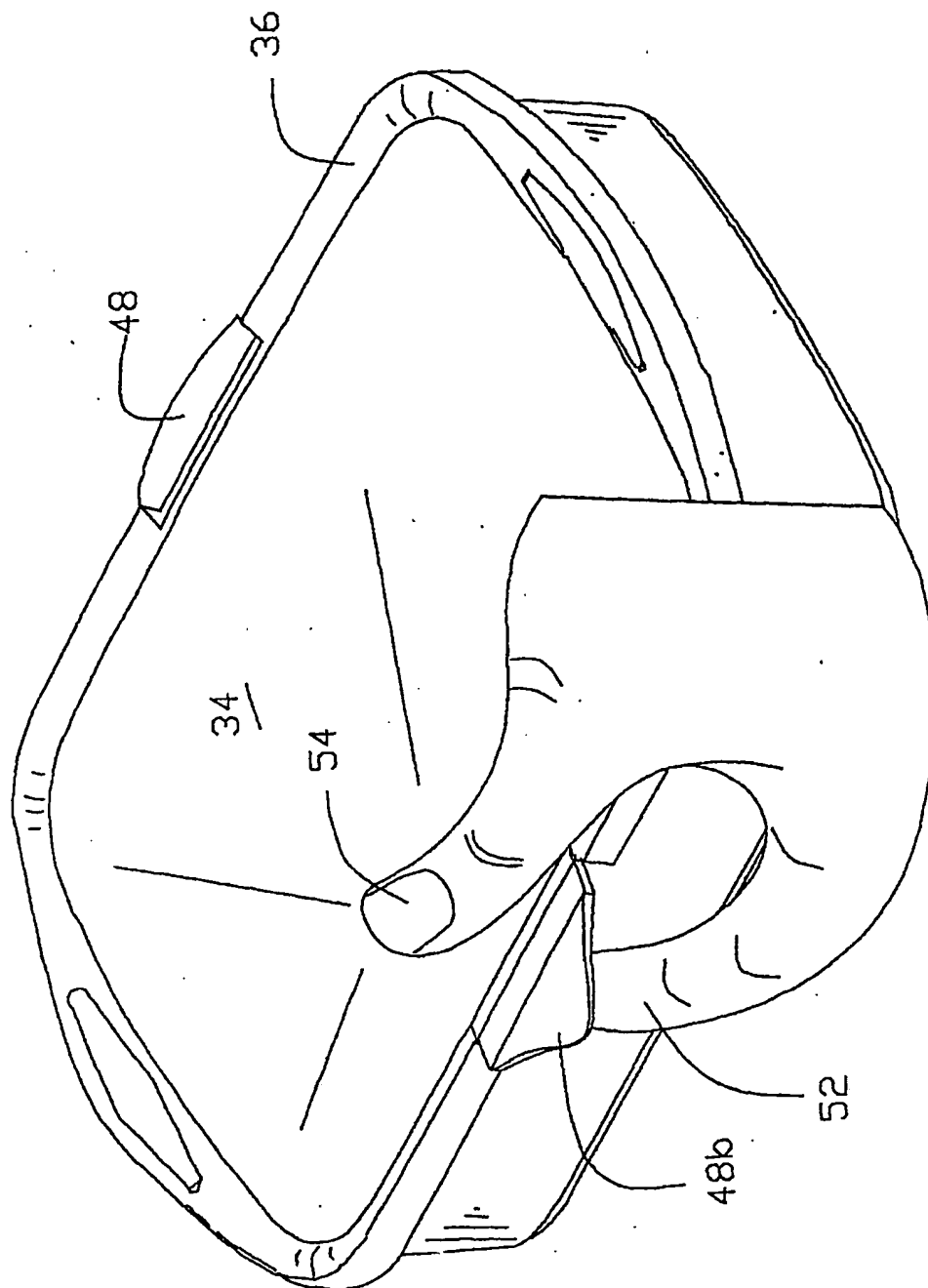


Fig. 12

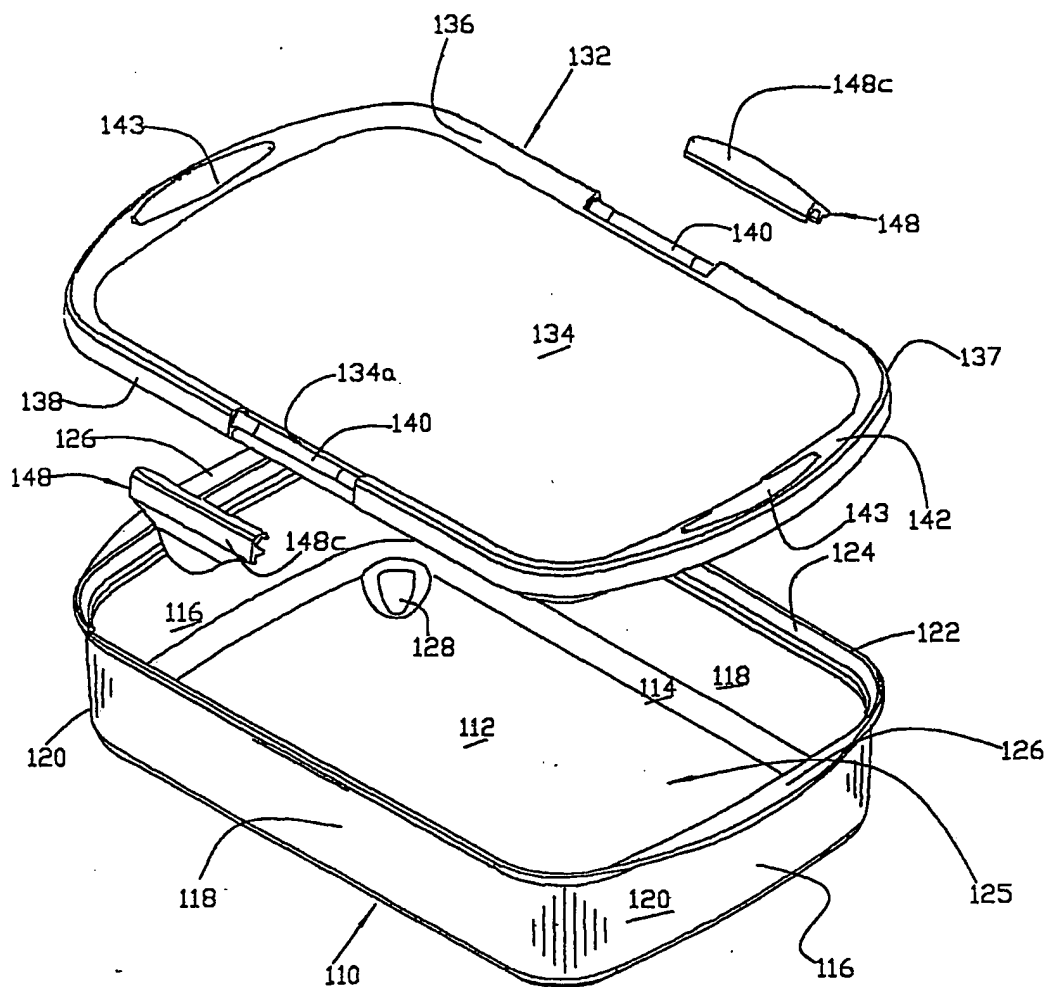


Fig. 14



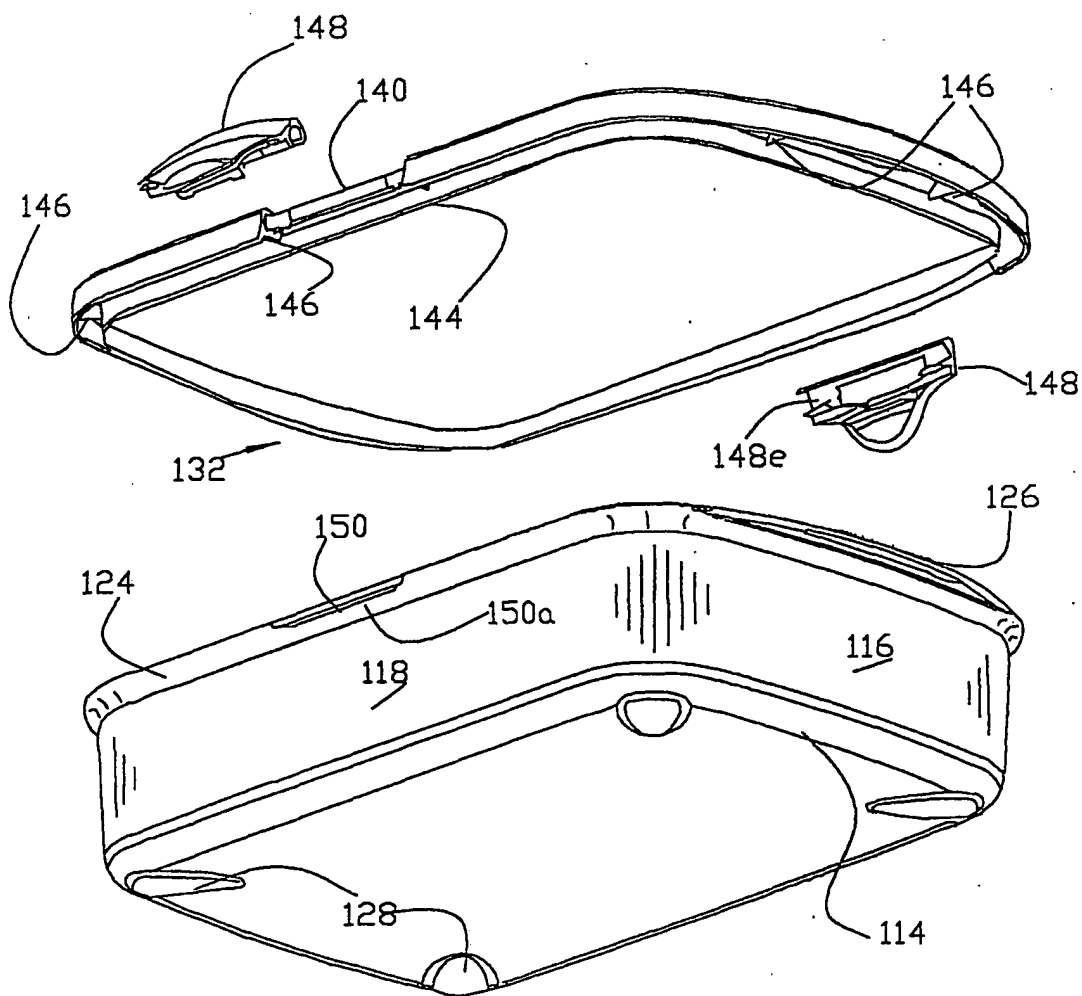


Fig. 15

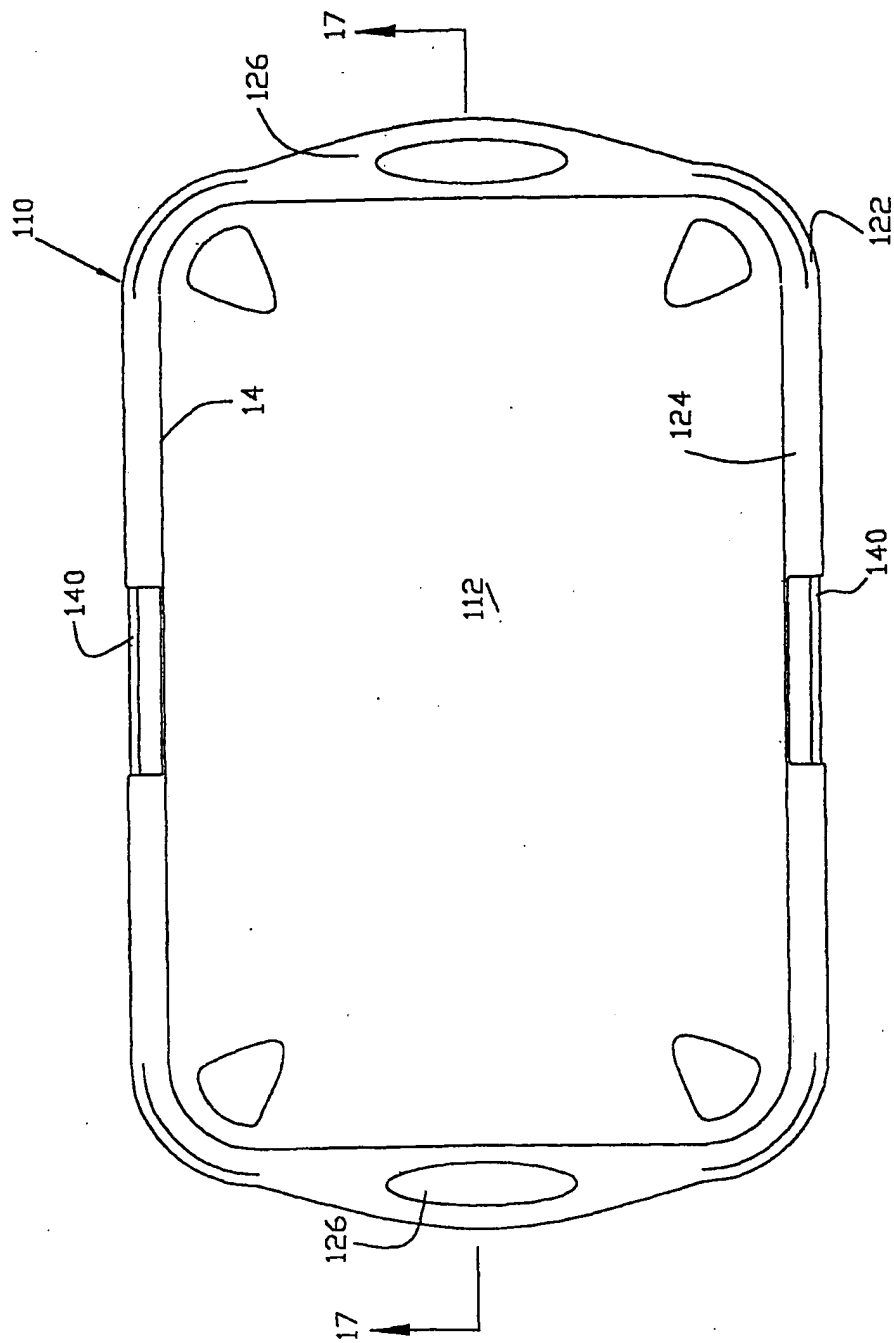


Fig. 16

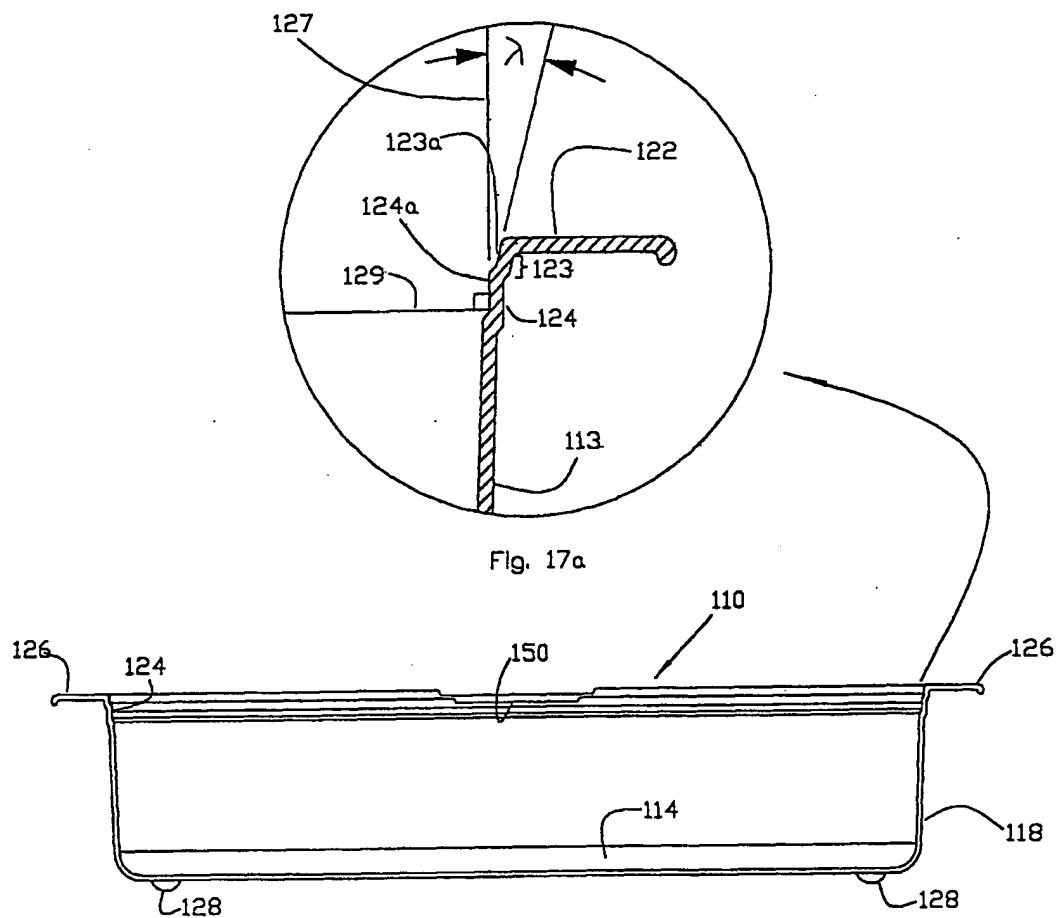
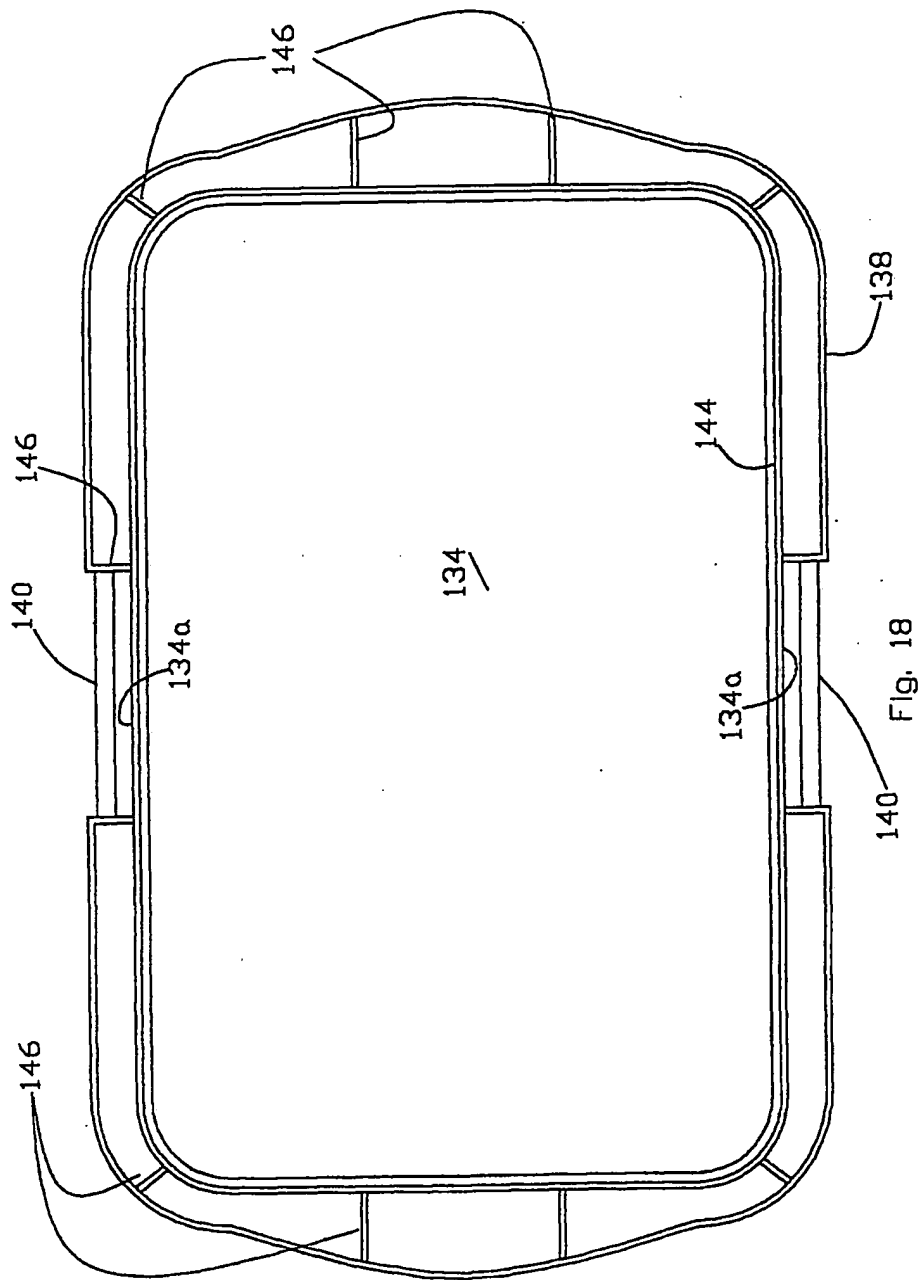
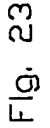
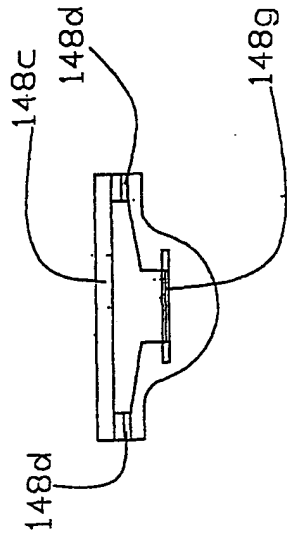
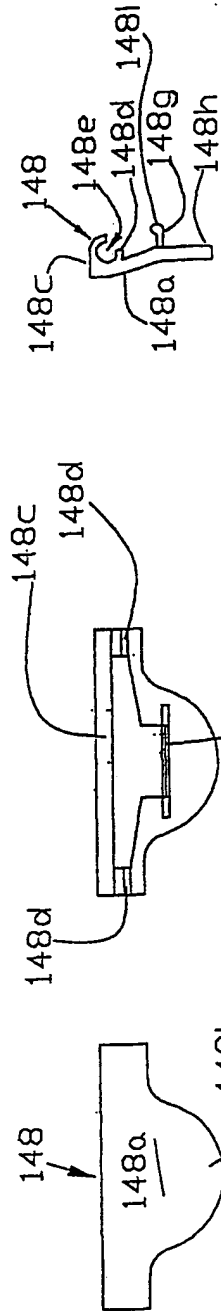
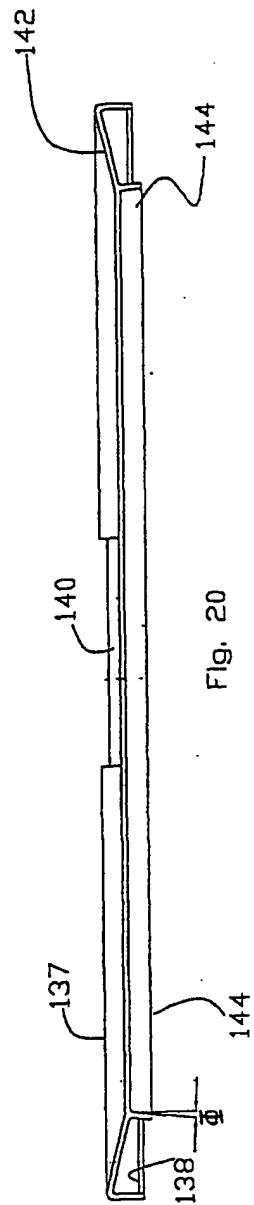
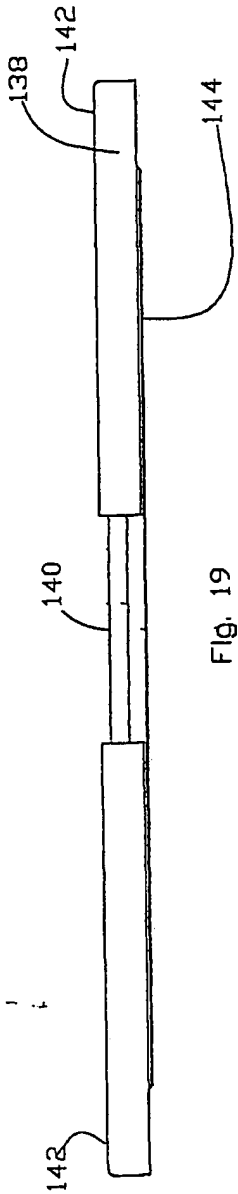


Fig. 17





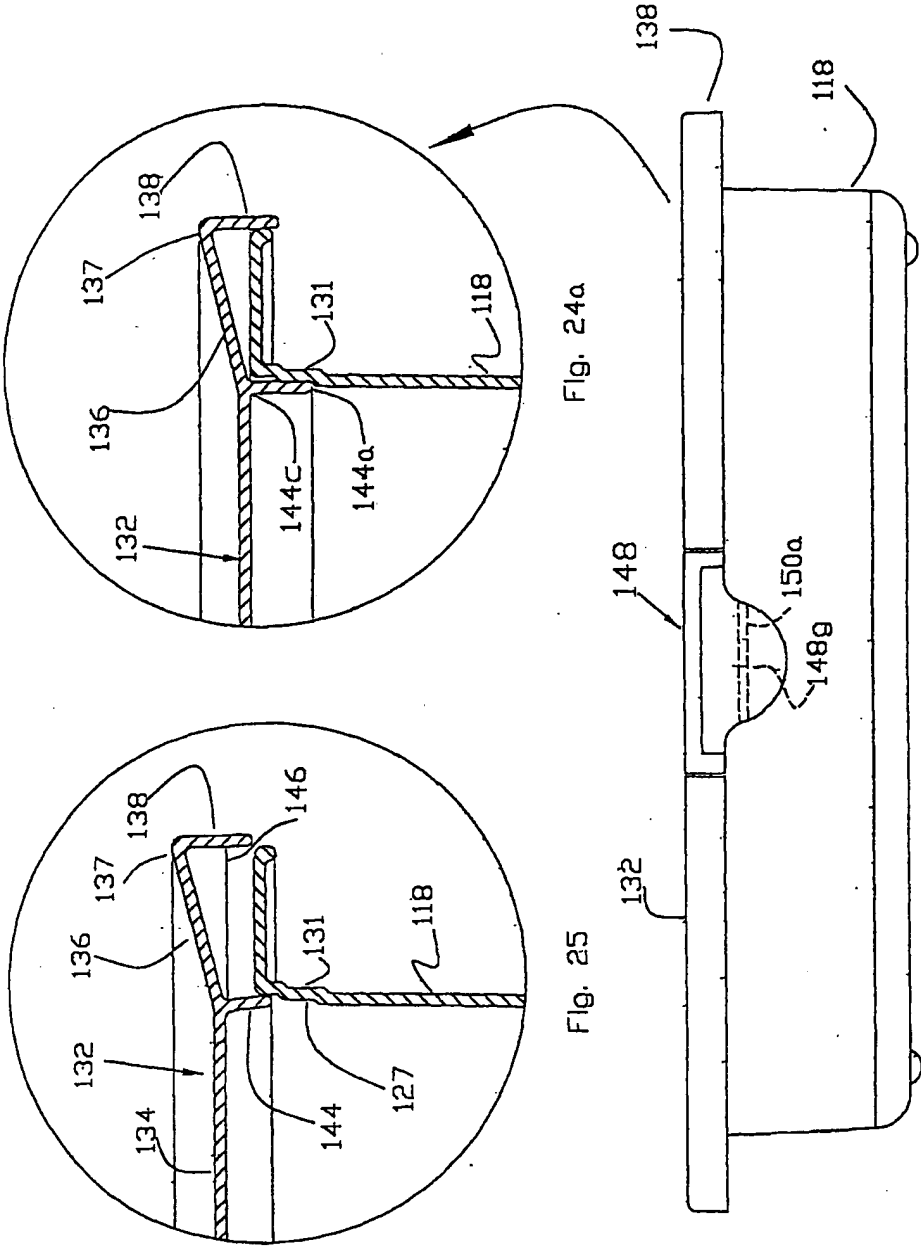


Fig. 24

Fig. 25

Fig. 24a

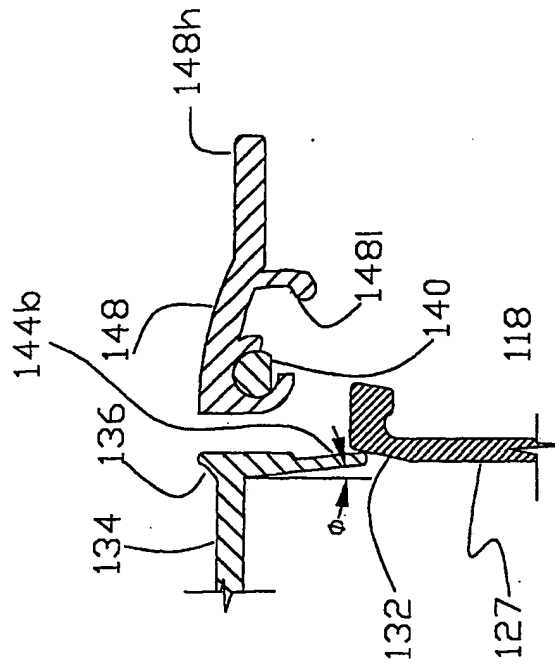


Fig. 26

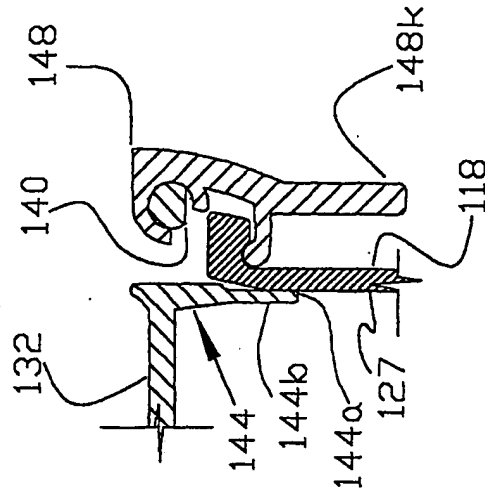


Fig. 27

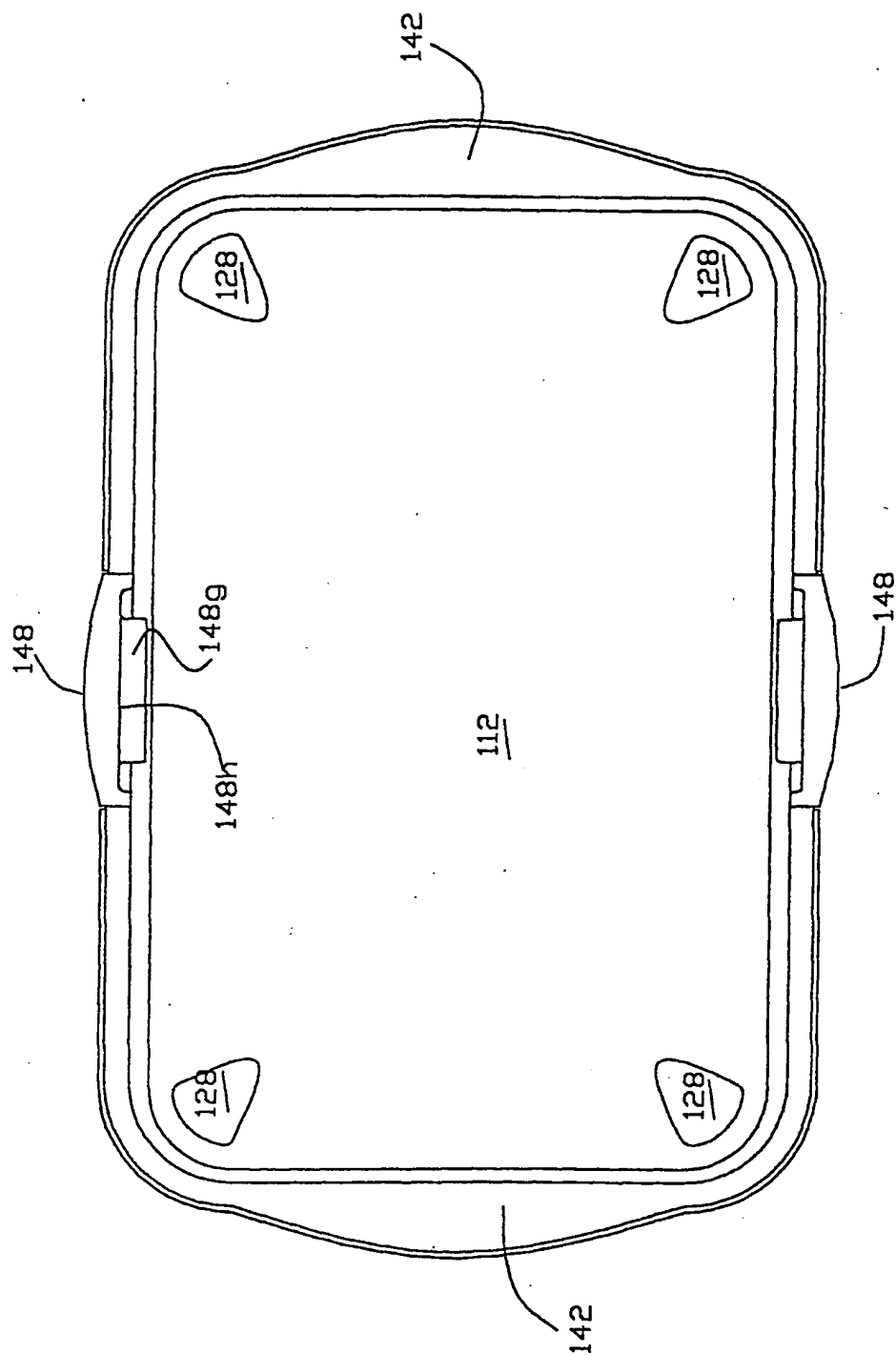


Fig. 28



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US01/41317

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>														
IPC(7) : B65D 45/16, 83/10 US CL : 220/324; 206/370 According to International Patent Classification (IPC) or to both national classification and IPC														
<b>B. FIELDS SEARCHED</b>														
Minimum documentation searched (classification system followed by classification symbols) U.S. : 220/324, 315, 318, 320, 326, 792, 794, 309.1, 309.2 ; 206/370, 363														
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched														
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST														
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>														
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.												
X	US 5,641,065 A (OWENS et al.) 24 June 1997, figs.1-4.	1-42												
Y, E	US 6,269,969 B1 (HUANG et al.) 07 August 2001, fig. 7.	1-42												
X --- Y	US 5,531,345 A (NAKAMURA et al.) 02 July 1996, figs. 1 and 2.	1-42												
Y	US 5,979,691 A (VON HOLDT) 09 November 1999, figs. 1 and 3.	1-42												
Y	US 5,520,301 A (SOHN) 28 May 1996, fig. 1.	1-42												
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.														
<table border="0"> <tr> <td>* Special categories of cited documents:</td> <td>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"E" earlier document published on or after the international filing date</td> <td>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"G" document member of the same patent family</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td></td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"G" document member of the same patent family	"O" document referring to an oral disclosure, use, exhibition or other means		"P" document published prior to the international filing date but later than the priority date claimed	
* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention													
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"P" document published prior to the international filing date but later than the priority date claimed														
Date of the actual completion of the international search 27 AUGUST 2001		Date of mailing of the international search report <b>14 SEP 2001</b>												
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer LIEN NGO Telephone No. (703) 305-6191 <i>Shela Vence</i> <b>Patrol Specialist</b> <b>Technology Center 3700</b>												